Research Reports

Cryptozoology, 10, 1991, 55–65
© 1991 International Society of Cryptozoology

PHYSICAL AND MORPHOLOGICAL ANALYSIS OF SAMPLES OF FIBER PURPORTED TO BE SASQUATCH HAIR

EDWARD B. WINN
25, chemin de Trembley, 1197 Prangins, Switzerland

ABSTRACT: Analytical tests consisting of examination by electron microscopy, melting-point measurements, and determination of solubility in seven representative solvents were conducted on samples of short, reddish, fur-like fibers purported to be samples of Sasquatch hair. The same tests were run on control samples of modacrylic fiber, a synthetic fiber commonly used for synthetic furs, wigs, and artificial hair. The results show clearly that all samples of the fiber claimed to be Sasquatch hair were in fact synthetic modacrylic fiber and, in all likelihood, were samples of the "Dynel" modacrylic fiber manufactured by the Union Carbide Corporation. The allegation that these fibers were Sasquatch hair thus clearly represents a hoax, and is described by the author as "scientific vandalism."

INTRODUCTION

There has been considerable controversy surrounding evidence for the existence of the animal known as Sasquatch. Some reported sightings are believed to be hoaxes, and certain examples of indirect evidence, such as samples of hair, blood, and fecal droppings, are also suspected of having been hoaxed.

One such case of falsification was reported in the symposium Sasquatch Evidence: Scientific and Social Implications, sponsored by the International Society of Cryptozoology and held at Washington State University, Pullman, Washington, on June 24–25, 1989 (Somer 1989). In this report, it was shown through photomicrographic analysis and observation of softening and melting at elevated temperatures that the purported hair was, in fact, a synthetic fiber.

Another presentation at the above-mentioned symposium produced physical evidence in the form of sections of twisted trunks of small trees about 3–4 inches (8–10 cm) in diameter said to have been twisted by a Sasquatch (Freeman 1989). Short strands of reddish, fur-like fiber were attached to protuberances on these twisted tree trunks—presumably left by the Sasquatch

involved. Several strands of these reddish fibers were taken surreptitiously by the author at the conclusion of the presentation, and without the knowledge of the speaker. These hair-bearing twisted trees had been found in an area of the Blue Mountains of southern Washington and northern Oregon.

Subsequently, at the end of the symposium, a larger sample of reddish-brown, hair-like fiber was supplied to the author by Grover S. Krantz, an anthropologist at Washington State University who chaired the symposium. According to Krantz, this sample had been collected a year or two previously in the same region of the Blue Mountains of Washington/Oregon.

Because of the prevalence of hoaxes in connection with claimed sightings of Sasquatches and other evidence said to be related to them, it was decided to undertake a thorough investigation of the above-mentioned fiber samples. The purpose of this investigation was to determine if the samples were in fact animal hairs, and, if not, to identify to the extent feasible their chemical composition and origin.

Method

Photomicrographs in both longitudinal and cross-sectional views were made on both of the above-described samples, the small sample collected from the Freeman evidence (Sample A), as well as the larger sample supplied by Krantz (Sample B). (Unfortunately, Sample A was too small to permit the use of any other analytical technique.)

These were compared with photomicrographs made under comparable conditions (longitudinal views and cross sections at similar degrees of magnification) of a variety of fibers, both natural and synthetic, as published in the handbook *Identification of Textile Materials* (The Textile Institute 1985). The fibers which were used as controls for this comparison are listed in Table 1.

In this comparison of photomicrographs, it was clear that the longitudinal and cross-sectional views of both purported Sasquatch hair samples, A and B, most closely resembled comparable views of modacrylic fibers. In this first step of photomicrographic examination, fibers from two sources were used: The "Teklan" modacrylic fiber produced by Courtaulds Ltd. in the United Kingdom, and the "Dynel" modacrylic fiber formerly produced by the Union Carbide Corporation in the United States. Of these two, the morphological characteristics of the "Dynel" modacrylic fiber appeared to match most closely those of the two fiber samples (A and B) purported to be Sasquatch hair, both in longitudinal and in cross-section views.

For the reason given above, the further analytical work, which consisted of comparative measurements of melting point and solubility in a number of representative solvents, was conducted only on Sample B of the purported Sasquatch hair and on a known specimen of "Dynel" modacrylic fiber.

Table 1.—Fibers used as controls in first step of identifying the samples of unknown origin and alleged to be Sasquatch hair.

Natural fibers	Synthetic fibers
Animal	Viscose
Wool	Cellulose acetate
Mohair	Cellulose triacetate
Cashmere	Acrylic
Horse hair	Modacrylic 6,6 nylon
Vegetable	
Silk	Polyester
Cotton	Polyvinyl alcohol
Flax	
Jute	
Ramie	

Results

Photomicrographs

Fig. 1a shows an electron photomicrograph of Sample A of alleged Sasquatch hair in longitudinal view at magnification of 20×. Fig. 1b shows the same sample at magnification of 200×. Fig. 2a shows an electron photomicrograph of Sample B of purported Sasquatch hair in longitudinal view at magnification of 20×, and Fig. 2b shows the same sample at magnification of 200×. Fig. 3 shows an electron photomicrograph in longitudinal view of "Dynel" modacrylic fiber at magnification 750×.

Fig. 4 shows an electron photomicrograph of Sample A in cross section at magnification 230×, and Fig. 5 shows Sample B in cross section also at magnification 230×. For comparison, Fig. 6 shows an electron photomicrograph of "Dynel" modacrylic fiber in cross section at magnification 750×. Figs. 3 and 6 have been reproduced from pp. 114–15 of the handbook *Identification of Textile Materials* (The Textile Institute 1985).

In comparing these photomicrographs, two points in particular should be noted. First, the photomicrographs in longitudinal view of Sample A, Sample B, and the "Dynel" modacrylic fiber all show clearly the deeply fluted surface which is characteristic of "Dynel" modacrylic fiber. Second, neither in Sample A nor in Sample B do the fibers show the surface scales which are characteristic of most animal fibers.

Melting Point

Melting points of the Sample B fiber and of "Dynel" modacrylic fiber were determined by the copper-block method (Preston 1949). This method uses a copper block in the form of an inverted "L," with the upper surface being slotted to hold the fiber sample and drilled for a thermometer pocket.

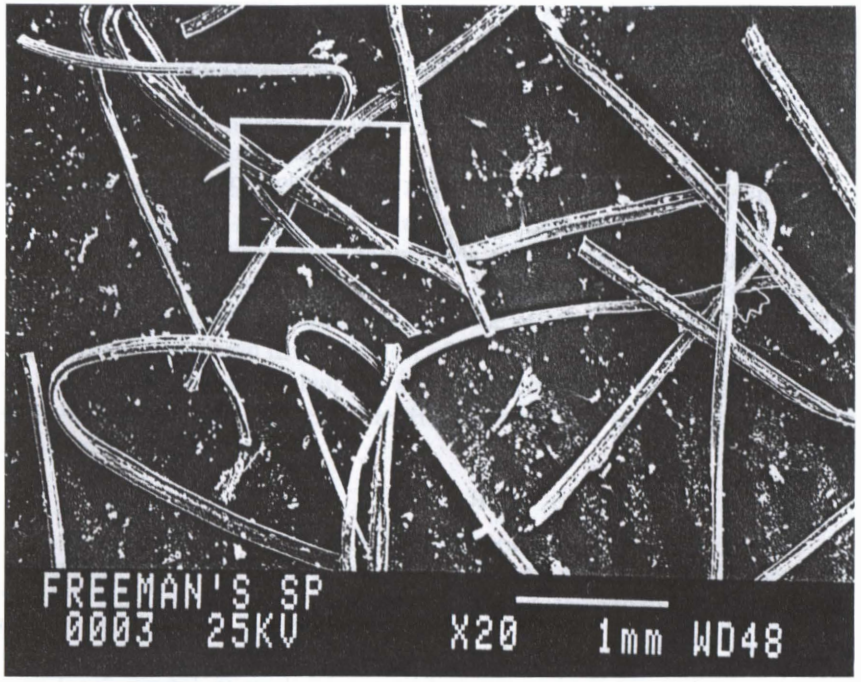

FIG. 1a.—Sample A, longitudinal view, 20×.

The shape of the copper block enables the overhanging part of the inverted "L" to be heated in a Bunsen flame without the hot gases reaching the fiber sample. The fiber sample is placed in the slot, the block is heated slowly, and the temperature at which the fibers soften can be observed to within quite narrow limits.

By this method, the following melting points were obtained:

Sample B:	188 ± 2°C
"Dynel" modacrylic fiber:	190 ± 2°C.

Both fiber samples may thus be considered to have essentially the same melting point.

It should also be noted that animal fibers in general do not exhibit well-defined melting points or even melting ranges. When heated, they char, discolor, and decompose rather than soften and melt.

The observance of a clearly defined melting point suggests quite strongly that the Sample B fiber is, in fact, composed of a synthetic polymer. Further, the only synthetic fibers known to have melting points in the region of 190°C are the modacrylics and certain chlorofibers. However, these latter may be

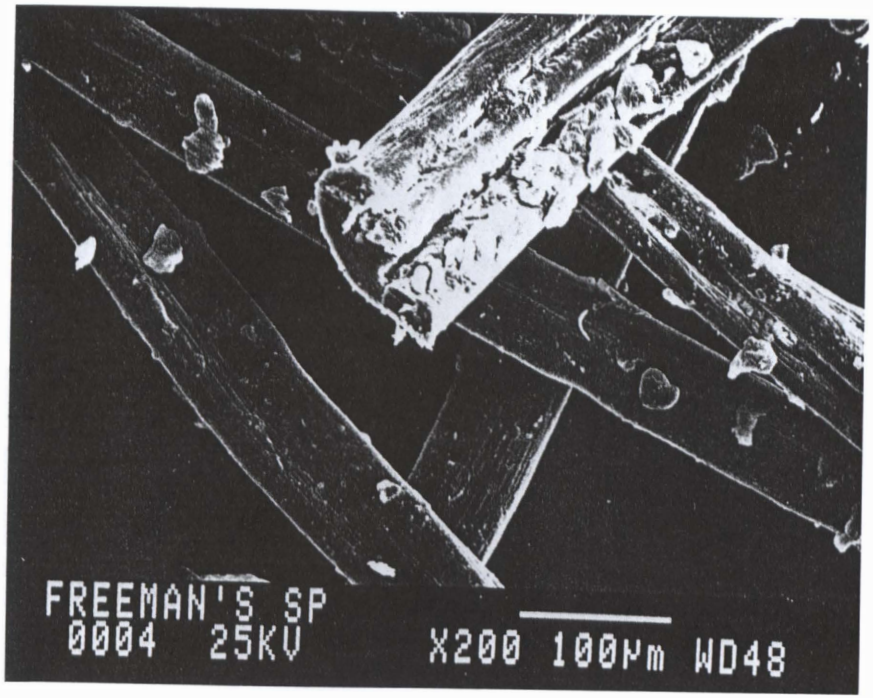

FIG. 1b.—Sample A, longitudinal view, 200×.

excluded from consideration in the comparison presented here, as their cross sections are essentially circular (The Textile Institute 1985: 111–13), and thus bear no resemblance to the fiber cross sections shown in Figs. 4, 5 and 6.

Solubility

Both the Sample B fiber and the control sample of "Dynel" modacrylic fiber were found to dissolve completely when immersed in the solvents listed in Table 2.

No animal fiber is known which will dissolve in all of the above solvents. However, "Dynel" modacrylic fiber is known to be soluble in all of these solvents. On the other hand, "Teklan" modacrylic fiber is known to dissolve in all *except* acetone at 35°C (The Textile Institute 1985).

DISCUSSION

From the electron photomicrographs and the measurements of melting point and solubility, it is clear that the Sample A and Sample B fibers are not of animal origin, but are almost certainly synthetic fibers. They do not show the surface scales characteristic of most animal hairs. Instead, they

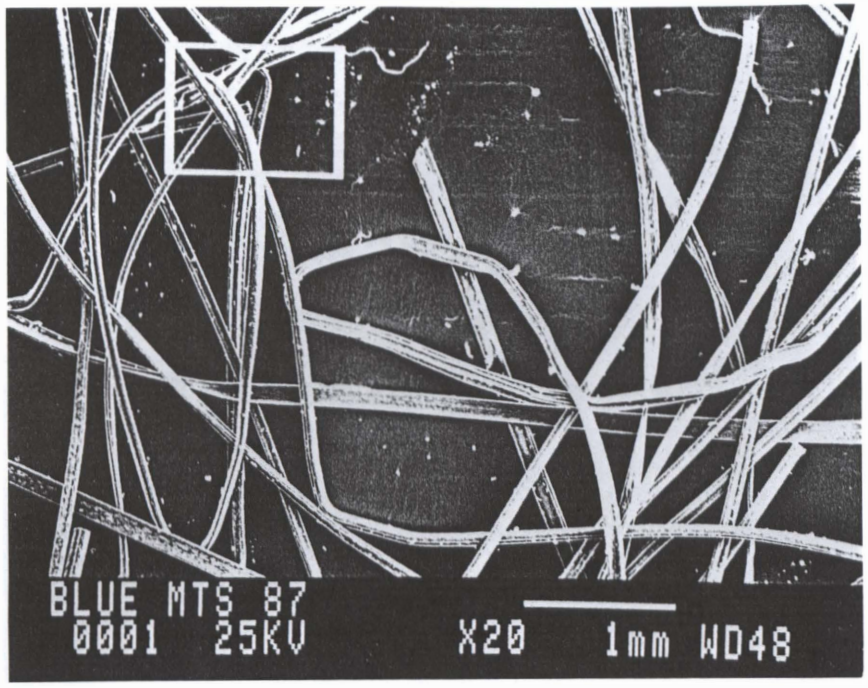

FIG. 2a.—Sample B, longitudinal view, 20×.

both show the smooth, fluted surface characteristic of modacrylic fibers. Further, the Sample B fiber exhibits the same melting point as "Dynel" modacrylic fiber, whereas animal hairs in general do not melt but, rather, char and decompose when heated. Further, the Sample B fiber proved to be soluble in seven conventional solvents in which "Dynel" modacrylic fiber is also known to dissolve. On the other hand, no known animal hair will dissolve in all of these seven solvents.

It is thus concluded that both Sample A and Sample B, both alleged to

TABLE 2.—Solvents used for testing the solubility of the Sample B fiber and of "Dynel" modacrylic fiber.

Butyrolactone at 20°C
Nitromethane at 20°C
Acetone at 35°C
Concentrated (75%) sulfuric acid at 20°C
65% nitric acid at 35°C
Cyclohexanone at 35°C
Dimethylformamide at 20°C

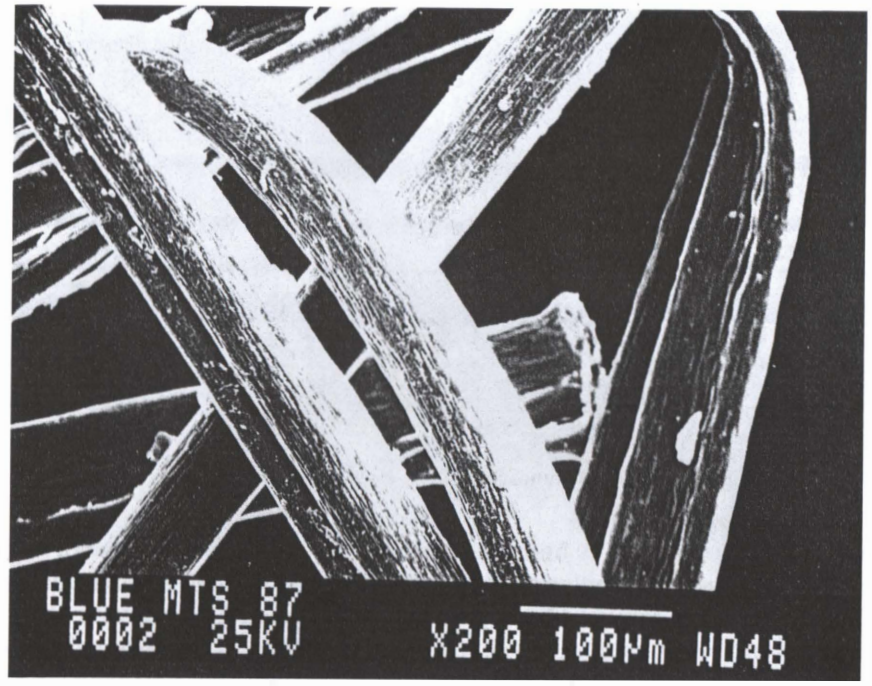

FIG. 2b.—Sample B, longitudinal view, 200×.

be Sasquatch hair, are in fact synthetic fibers. Further, both samples are almost certainly synthetic modacrylic fiber, and, very likely, are composed of the "Dynel" modacrylic fiber manufactured until recently by Union Carbide.

The "Dynel" modacrylic fiber is composed of a copolymer of acrylonitrile and vinyl chloride, containing somewhat more than 15% by weight of vinyl chloride. Its production by Union Carbide is believed to have been discontinued in recent years for economic reasons, although products containing this fiber are almost surely still available commercially. The principal uses of "Dynel" modacrylic fiber have been in synthetic furs and wigs where, when properly finished, its esthetic properties closely resemble those of natural animal fur and hair. Another important sector of use has been in fabrics for upholstery and home furnishings, where the relatively high chlorine content of the polymer imparts to the fiber a high degree of nonflammability.

Returning to the presentation by Freeman (1989), even though the fiber samples collected surreptitiously from the tree trunks were found clearly to be fraudulent, one still has to explain the condition of the tree trunks themselves, which had been fibrillated and shattered by a twisting motion. It could be argued that the force needed to accomplish such twisting is well

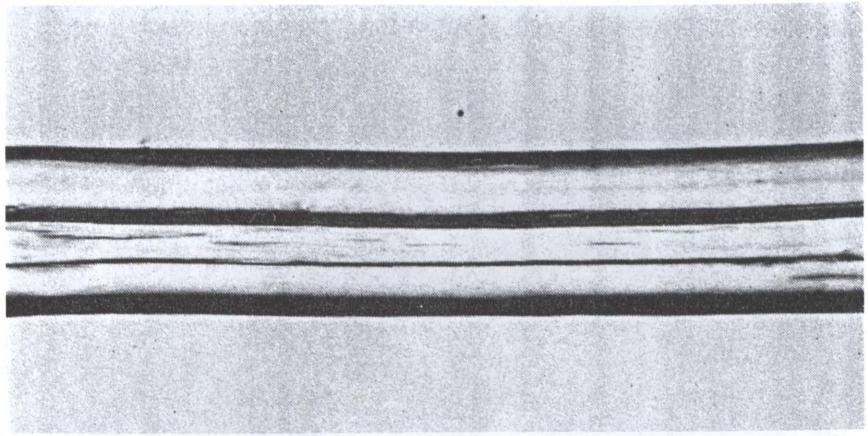

FIG. 3.—"Dynel" modacrylic fiber, longitudinal view, 750×.

beyond the strength of any human, and that the only animal capable of such strength and such manipulation would be the primate known as Sasquatch.

This conjecture can readily be disproven. In the first place, very strong gusts of wind, such as occur in severe thunderstorms, can easily twist and shatter the trunks of trees 3–4 inches (8–10 cm) in diameter, and even larger. Much more likely, however, is that the specimens of twisted tree trunks

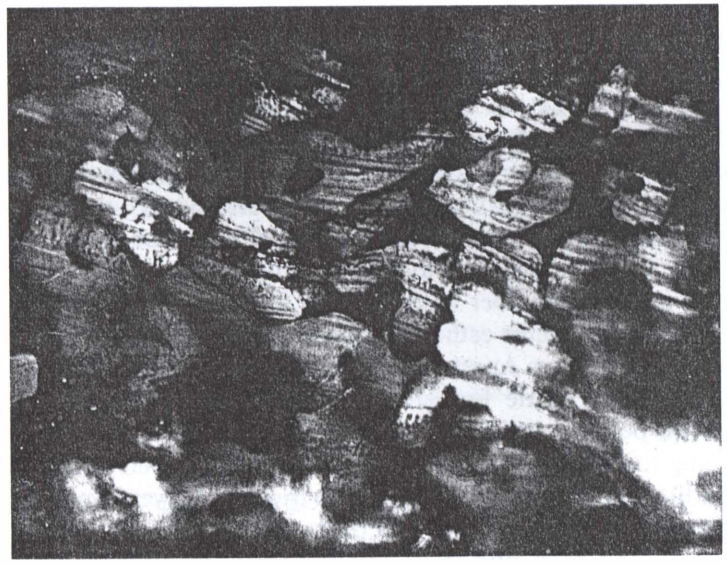

FIG. 4.—Sample A, cross section, 230×.

FIG. 5.—Sample B, cross section, 230×.

exhibited by Freeman at the symposium were shattered by human efforts. This could readily be accomplished with a chain link vise, such as those used by plumbers to hold pipes for cutting or threading. Such devices often are used on construction projects where suitable shop facilities are not readily available.

To twist and shatter a tree trunk 3–4 inches (8–10 cm) in diameter, one would attach a chain link vise to the trunk, perhaps 6 feet (2 m) or more above the ground. At the pressure point of the vise, the tree could be wrapped with a few protective layers of coarse fabric; this would avoid "bite" marks on the bark. With an extension handle of 6 feet (2 m) or more in length on the vise, one would then exert a twisting motion around the axis of the trunk. In this way, a reasonably strong human could easily exert more torque than several Sasquatches working together, and certainly enough to twist the tree to the point of shattering.

To prevent uprooting, and to focus the damage to the tree at a particular point, it would be a simple matter to apply two such vises 3–6 feet (1–2 m) apart, and then twist in opposing directions. Any telltale evidence of the use of such vises could then be eliminated simply by cutting or sawing the tree trunk between the point of fibrillation and the points where it had been held by the vises, and exhibiting only the part of the trunk showing the damage by twisting.

The samples of purported Sasquatch hair which are described here plainly

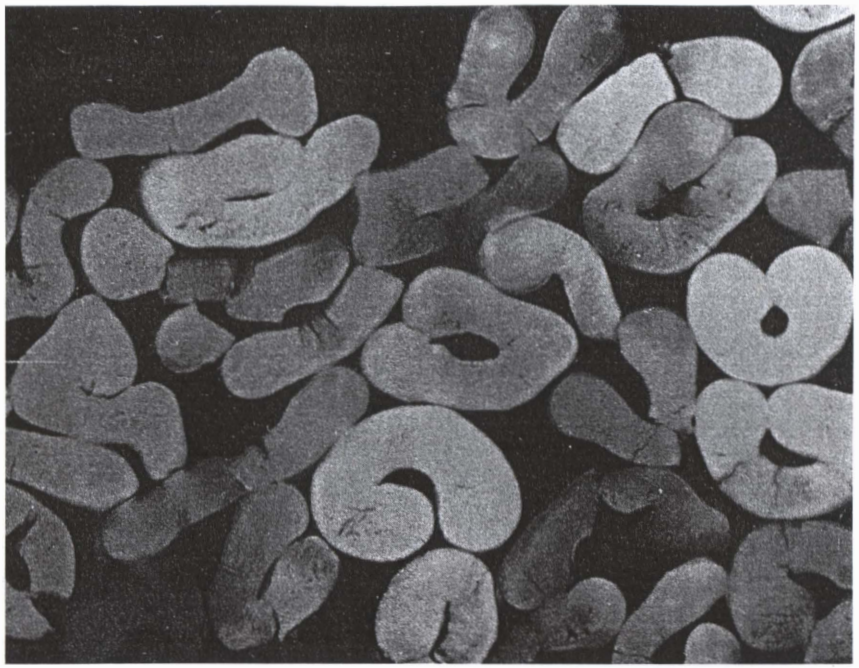

FIG. 6.—"Dynel" modacrylic fiber, cross section, 750×.

are deliberate hoaxes. This fact, combined with the proposed explanation of how one or two humans could twist small tree trunks to the point of shattering, demonstrates that the symposium presentation by Freeman (1989) is plainly a complete fabrication.

Because of the interference and damage done by such hoaxes to the reputation and standing of serious and objective scientists working in a controversial area such as Sasquatch studies, the author considers that these hoaxes may be fairly and most kindly described as "scientific vandalism."

The author wishes to express his thanks to the Physical Testing Section of the Textile Research Laboratory of Du Pont De Nemours International S.A., in Geneva, for preparing the photomicrographs of the samples of purported Sasquatch hair, and for conducting the measurements of melting point and solubility on these as well as on a control sample of "Dynel" modacrylic fiber.

REFERENCES CITED

Freeman, Paul
1989 Bigfoot in the Blue Mountains. Paper presented at the symposium "Sasquatch Evidence: Scientific and Social Implications," Eighth Annual Membership Meeting, International Society of Cryptozoology, June 24–25, 1989, Washington State University, Pullman, Washington.

Preston, J. M.
1949 Method for the Determination of Fibre Melting Points. *Journal of the Textile Institute,* Vol. 40: T767.

Somer, Lonnie
1989 Morphological Analysis of Possible Sasquatch Hair Recovered from the Blue Mountains of Washington State. Paper presented at the symposium "Sasquatch Evidence: Scientific and Social Implications," Eight Annual Membership Meeting, International Society of Cryptozoology, June 24–25, 1989, Washington State University, Pullman, Washington.

The Textile Institute
1985 *Identification of Textile Materials.* 7th edition. Manchester: The Textile Institute.